# CLAIMS

1. An article comprising a porous structure defined by pores separated by walls, the walls comprising a composition that is substantially crystalline and that is comprised of at least 50% carbon, at least 90% of the pores having an entrance diameter with a largest cross-sectional dimension smaller than 50 nm.

2. An article as in claim 1, wherein the porous structure comprises at least 70% carbon by weight.

3. An article as in claim 1, wherein the porous structure comprises at least 80% carbon by weight.

4. An article as in claim 1, wherein the porous structure comprises at least 90% carbon by weight.

5. An article as in claim 1, wherein the porous structure comprises at least 95% carbon by weight.

6. An article as in claim 1, wherein the porous structure comprises at least 98% carbon by weight.

7. An article as in claim 1, wherein, of all carbon contained in the porous structure, at least 50% of the carbon exhibits electron diffraction typical of crystalline material, and has a crystal lattice observable by electron microscopy within walls structure.

8. An article as in claim 1, wherein all carbon in the structure is at least 50% crystalline.

9. An article as in claim 1, wherein walls of the structure are defined by material that is at least 50% crystalline.

10. An article as in claim 1, wherein the porous structure has an electrical resistivitiy of no more than 20 Ohm.cm.

11. An article as in claim 1, wherein the porous structure has an electrical resistivity of no more than 1 Ohm.cm.

12. An article as in claim 1, wherein the porous structure has an electrical resistivity of no more than .01 Ohm.cm.

13. An article as in claim 1, wherein the porous structure has an electrical resistivity of no more than 0.001 Ohm.cm.

14. An article as in claim 1, wherein at least 50% of all pores in the structure have a smallest internal diameter that is at least 2 nm and that is no more than 50 nm.

15. An article as in claim 1, wherein the average pore size throughout the porous structure is from 3 to 60 nm.

16. An article as in claim 1, wherein the average pore size throughout the porous structure is from 5 to 50 nm.

17. An article as in claim 1, wherein the average pore size throughout the porous structure is from 5 to 30 nm.

18. An article as in claim 17, wherein at least 98% of all pores of the porous structure have a smallest internal dimension that is no more than 50 nm.

19. An article as in claim 1, wherein at least 98% of all pores of the porous structure have a smallest internal dimension that is no more than 50 nm.

20. An article as in claim 1, wherein at least 50% of all pores in the porous structure have a pore size range varying by no more than 30% from the average pore size of the structure.

21. An article as in claim 1, wherein at least 60% of all pores in the porous structure have a pore size range varying by no more than 30% from the average pore size of the structure.

22. An article as in claim 1, wherein at least 70% of all pores in the porous structure have a pore size range varying by no more than 30% from the average pore size of the structure.

23. An article as in claim 1, wherein at least 80% of all pores in the porous structure have a pore size range varying by no more than 30% from the average pore size of the structure.

24. An article as in claim 1, wherein the porous structure has a total pore volume of at least 0.1 cc/g.

25. An article as in claim 1, wherein the porous structure has a total pore volume of at least 0.2 cc/g.

26. An article as in claim 1, wherein the porous structure has a total pore volume of at least 0.3 cc/g.

27. An article as in claim 1, wherein the porous structure has a total pore volume of at least 0.4 cc/g.

28. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 5 microns.

29. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 100 microns.

30. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 1 mm.

31. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 5 mm.

32. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 1 cm.

33. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 2 cm.

34. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 5 cm.

35. An article as in claim 1, wherein the porous structure has a maximum cohesive cross-sectional dimension of no less than 10 cm.

36. An article as in claim 1, wherein the porous structure has a smallest cohesive cross-sectional dimension of no less than 5 microns.

37. An article comprising a porous structure having a maximum cohesive cross-sectional dimension of no less than 5 microns, free of binder upon which the cohesiveness of the article is dependent, defined by pores separated by walls comprising a composition that is substantially crystalline, at least 90% of which pores have an entrance diameter with a largest cross-sectional dimension smaller than 50 nm.

38. An article as in claim 37, wherein the porous structure comprises at least 50% carbon.

39. An article as in claim 37, wherein the porous structure has a total electrical resistivity of no higher than 20 Ohm.cm.

40. An article comprising a porous structure defined by pores separated by walls comprising a composition that is substantially crystalline, at least 90% of which pores have an entrance diameter with a largest cross-sectional dimension smaller than 50 nm, the porous structure having a total electrical resistivity no higher than 20 Ohm.cm.

41. A method of making a porous solid carbon structure, comprising:

mixing a carbon-containing precursor of the structure with an amphiphilic molecular species;

polymerizing the precursor in the presence of the amphiphilic molecular species under conditions and for a period of time sufficient to define a polymerized porous carbon structure

having pores occupied by the amphiphilic molecular species and with structural integrity such that, after removal of the amphiphilic molecular species, the porous structure is substantially unchanged;

carbonizing the polymerized porous carbon structure under conditions and for a period of time sufficient to remove substantially all of the amphiphilic molecular species from the material and continuing carbonization until a desired degree of carbonization is obtained, to form a porous carbonized product having pores, substantially identical to the amphiphilic molecular species-containing polymerized porous carbon structure, defined by voids occupied by amphiphilic molecular species prior to carbonization.

42. A method as in claim 41, comprising carbonizing the polymerized porous carbon structure at a temperature above the boiling point of the amphiphilic molecular species.

43. A method as in claim 41, comprising polymerizing the precursor under conditions in which the amphiphilic molecular species is substantially retained in the pores.

44. A method as in claim 41, comprising polymerizing the precursor at a temperature below the boiling point of the amphiphilic molecular species.

45. A method as in claim 41, comprising polymerizing the precursor in the presence of a polymerization catalyst.

46. A method as in claim 41, wherein the porous carbonized product has pores, at least 90% of which have an entrance diameter with a largest cross-sectional dimension smaller than 50 nm.

47. A method as in claim 41, comprising polymerizing the precursor for a period of time sufficient to define at least some crystallinity in the carbon while maintaining substantially all of the amphiphilic molecular species in combination with the precursor.

48. A method as in claim 41, wherein the amphiphilic molecular species does not undergo chemical reaction during the method.

49. A method as in claim 41, wherein the porous carbonized product has a mass equal to at least 10% of the total mass of all starting materials involved in the method.

50. A method as in claim 41, wherein the porous carbonized product has a mass equal to at least 15% of the total mass of all starting materials involved in the method.

51. A method as in claim 41, wherein the porous carbonized product has a mass equal to at least 20% of the total mass of all starting materials involved in the method.

52. A method as in claim 41, wherein the porous carbonized product has a mass equal to at least 25% of the total mass of all starting materials involved in the method.

53. A method as in claim 41, wherein the porous carbonized product has a mass equal to at least 30% of the total mass of all starting materials involved in the method.

54. A method as in claim 41, wherein the method is carried out in the absence of any solvent that is not a byproduct of any reaction involved in the method.

55. A method as in claim 41, wherein the porous carbonized product comprises a porous structure defined in claim1.

56. A method as in claim 41, wherein the porous carbonized product comprises a porous structure as defined in claim 37.

57. A method as in claim 41, wherein the porous carbonized product comprises a porous structure as defined in claim 40.

58. A method of making a porous solid carbon structure, comprising:

mixing a carbon-containing precursor with an amphiphilic molecular species to form a mixture which, if cooled to the point of at least partial solidification, exibits x-ray diffraction peaks substantially different from those of either the amphiphilic species or carbon-containing precursor;

polymerizing the precursor under conditions and for a period of time sufficient to obtain a polymerized porous structure having pores occupied by the amphiphilic molecular species and with structural integrity such that, after removal of the amphiphilic molecule, the porous structure is substantially maintained;

carbonizing the polymerized porous structure at a temperature and a period of time sufficient to remove substantially all of the amphiphilic molecular species from the material and continuing carbonization until a desired degree of carbonization is obtained.

59. A method of making a porous solid carbon structure, comprising:

mixing a carbon-containing precursor with an amphiphilic molecular species in the presence of no auxiliary solvent or less than 25 wt % auxiliary solvent based on the total weight of the mixture;

polymerizing the precursor to obtain a substantially mesoporous structure having pores occupied by the amphiphilic molecular species and with structural integrity such that, after removal of the amphiphilic molecule, the porous structure is substantially maintained;

carbonizing the polymerized porous structure at a temperature and a period of time sufficient to remove substantially all of the amphiphilic molecular species from the material and continuing carbonization until a desired degree of carbonization is obtained.